

WHAT IS CLAIMED IS:

1. A material having a layer, the layer comprising a plurality of self-assembled structures comprising compositions, wherein the structures are localized in separate islands covering a portion of the layer in an integrated assembly.

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2. The material of claim 1 wherein the compositions comprise organic compounds.

3. The material of claim 1 wherein the compositions comprise inorganic particles.

4. The material of claim 3 wherein the inorganic particles have an average secondary particle diameter from about 2 nm to about 200 nm.

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5. The material of claim 3 wherein the inorganic particles have an average secondary particle diameter less than about 100 nm and the primary particles generally having a distribution in sizes such that at least about 95 percent, of the primary particles have a diameter greater than about 40 percent of the average diameter and less than about 160 percent of the average diameter.

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6. The material of claim 3 wherein the particles include effectively no primary particles with a diameter greater than about a factor of four times the average particle size.

7. The material of claim 3 wherein the particles have an average secondary particle diameter less than about 100 nm, the particles being located within pores of a material in the layer.

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8. The material of claim 3 wherein the particles comprise a metal oxide.

9. The material of claim 1 wherein the compositions are attached to the surface with a linker molecule.

10. The material of claim 9 wherein the linker molecule comprises an organic compound with two functional groups.

11. The material of claim 1 wherein the particles are fluorescent particles.

12. The material of claim 1 wherein the composition comprises a metal.

13. The material of claim 1 wherein the composition comprises a biological macromolecule.

14. The material of claim 1 wherein the composition has a high index of refraction.

15. A material comprising a self-assembled formation of inorganic particles, the inorganic particles having an average primary particle diameter less than about 100 nm and the particles comprising a composition selected from the group consisting of metal/silicon oxides, metal/silicon carbides, metal/silicon nitrides and elemental metal.

16. The material of claim 15 wherein the primary particles have a distribution in sizes such that at least about 95 percent, of the primary particles have a diameter greater than about 40 percent of the average diameter and less than about 160 percent of the average diameter.

17. A method for generating devices on a layer within specified boundaries, the method comprising:

localizing the boundaries of the devices; and  
initiating a self-assembly process to deposit a plurality of structures comprising compositions within the boundaries.

18. The method of claim 17 wherein the compositions comprise particles having an average primary particle diameter less than about 100 nm.

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31. The article of claim 30 wherein the device is a field emission device, a field effect transistor.

32. The article of claim 30 wherein the device is a battery.

33. The article of claim 30 wherein the device is an optical interconnect.

34. The article of claim 30 wherein the device comprises inorganic particles having an average diameter from about 2 nm to about 100 nm.

35. The article of claim 34 wherein the particles include effectively no particles with a diameter greater than about a factor of four times the average particle size.

36. The article of claim 34 wherein the particles comprise a metal oxide.

37. The article of claim 34 wherein the particles comprise a metal.

38. The article of claim 30 wherein the integrated devices are located in a plurality of interconnected layers.

39. The article of claim 30 wherein the device has a minimum diameter less than about 1 micron.

40. The article of claim 30 wherein the device has a minimum diameter less than about 0.13 microns.

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